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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,712	10/10/2003	Georg Bogner	12406-127001 / P2001,0258	2057
26161	7590	09/13/2006	EXAMINER	
FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			NGUYEN, JOSEPH H	
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			2815	

DATE MAILED: 09/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/683,712

Applicant(s)

BOGNER ET AL.

Examiner

Joseph Nguyen

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-15, 17-25, 27, 28, 30, 31, 33-49, 52 and 54-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-15, 17-25, 27, 28, 30, 31, 33-49, 52 and 54-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 6-7, 9, 12, 15, 27-28, 30-31, 33-40, 43-46, 49, 52, 58 and 60-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru (JP2000294832 and English Translation) in view of Hochstein (US 6517218).

Regarding claims 1 and 52, Minoru discloses in figure 1 a lead frame for radiation emitting component comprising a mount part having at least one wire connecting area 50; an opening formed therein and extending completely through the mount part; and at least one external electrical connecting strip 60; and a separately manufactured thermal connecting part 20 disposed in said opening and fastened into said mount part, said thermal connecting part having at least one chip mounting area and a reflector well 30 surrounding said chip mounting area (see Abstract). Note that the term "separately manufactured" is merely product by process and therefore does not structurally distinguish from Minoru herein.

Minoru does not disclose the thermal connecting part extending through the opening in the mount part and connecting to the mount part at the opening to transfer heat away from the mount part. However, Hochstein discloses in figure 2 the thermal

connecting part 30 extending through the opening in the mount part 18 and connecting to the mount part 18 at the opening to transfer heat away from the mount part (col. 3, lines 29-35). In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru by including the thermal connecting part extending through the opening in the mount part and connecting to the mount part at the opening to efficiently transfer heat away from the mount part as taught by Hochstein (col. 3, lines 29-35).

Regarding claim 2, Minoru discloses in figure 1 the mount part has an eye into which the thermal connecting part 20 is fastened.

Regarding claim 6, Minoru discloses in figure 1 the wire connecting area 50 is disposed at a higher level than the chip mounting area as viewed from said chip mounting area.

Regarding claim 7, Minoru discloses in figure 1 the reflector well 30 has an edge; and said wire connecting area 50 is disposed above said edge as viewed from the chip mounting area.

Regarding claim 9, Minoru discloses in figure 1 said thermal connecting part having at least one chip mounting area, and containing at least copper (para [0019], lines 1-2).

Regarding claim 12, Minoru discloses in figure 1 the lead frame contains at least copper (para [0019], lines 1-3).

Regarding claim 15, Minoru discloses in figure 1 the radiation-emitting component 40 is a light emitting diode component (see Abstract).

Regarding claim 27, Minoru discloses in figure 1 the lead frame 50 is a surface mounted a lead frame.

Regarding claim 28, Minoru discloses in figure 1 a housing for light emitting components comprising the lead frame of claim 1 and the light emitting components 40 being light emitting diodes (see Abstract).

Regarding claim 30, Hochstein discloses in figure 2 a radiation-emitting chip 12 at least partially sheathed with a radiation permeable compound 24 (col. 3, lines 15-17).

Regarding claim 31, Hochstein discloses in figure 2 the chip 12 is a semiconductor chip (para [0016], lines 1-2).

Regarding claim 33, Hochstein discloses the radiation permeable compound 24 is a plastic compound (para [0019], line 9). Note that element 24 is formed of epoxy, which is plastic.

Regarding claim 34, Hochstein discloses the plastic compound 24 is molding compound (para [0019], line 9).

Regarding claim 35, Hochstein discloses the plastic compound contains at least an epoxy resin (para [0019], line 9).

Regarding claim 36, Hochstein discloses in figure 2 substantially all the structure set forth in the claimed invention except the radiation permeable compound having a volume described by the formula $V \leq q \cdot H$ where H as a height of the chip and q being less than 10 mm^2 . However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Minoru and Hochstein by having the radiation permeable compound having a volume described by the formula $V \leq q \cdot H$

where H as a height of the chip and q being less than 10 mm^2 , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 37, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Minoru and Hochstein by having q being approximately equal to 7 mm^2 , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 38, Hochstein discloses in figure 2 the chip 12 is a semiconductor chip mounted on the chip mounting area of the thermal connecting part 30.

Regarding claims 39 and 40, Hochstein discloses the chip 12 is connected to the chip mounting area by an adhesive bond 22 (para [0019], lines 4-5).

Regarding claim 43, Hochstein discloses in figure 2 a wire connection 20 electrically conductively connecting the chip 12 to the wire connecting area 16.

Regarding claim 44, Hochstein discloses in figure 2 (also see rejection of claim 30) a method for producing a semiconductor component comprising providing the mount part; fastening the thermal connecting part having the chip mounting area into the opening formed in the mount part; fitting the radiation emitting chip to the chip mounting area and embedding the mount part and the thermal connecting part 18 in a housing molding compound 24.

Regarding claim 45, Hochstein discloses in figure 2 connecting the thermal connecting part 30 to the mount part by riveting. Note that the heat sink must be fastened to element 30 in order to properly function as a heat sink and to firmly hold the chip 12.

Regarding claim 46, Hochstein discloses fitting the chip 12 to the chip mounting area before the mount part and the thermal connecting part 18 are embedded in the housing molding compound 24 (para [0023]).

Regarding claim 49, Minoru discloses embedding the mount part and the thermal connecting part in the housing molding compound by injection molding (para [0016], lines 11-12).

Regarding claims 58 and 60, Minoru discloses in figure 1 the leadframe 50 is a surface mountable component.

Regarding claim 61, Minoru discloses in figure 1 a housing base body 10 formed from a molding compound wherein the leadframe 50 is embedded in the base body 10 to pass out the connecting trip 60 from the base body.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein in view of Barnett et al. (US 6,903,380)

Regarding claims 3-4, Minoru and Hochstein disclose substantially all the structure set forth in the claimed invention except the thermal connecting part and the mount part being connected by welding. However, Barnett et al. discloses 2 the thermal connecting part 14 and the mount part 54 being connected by welding (col. 9, lines 62-

65). In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru and Hochstein by having the thermal connecting part and the mount part being connected by welding to effectively provide an electrical connection (col. 9, line 66, Barnett et al.).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein.

Regarding claim 8, Minoru and Hochstein disclose substantially all the structure set forth in the claimed invention except the reflector well having height no greater than twice a height of the chip. However, it would have been an obvious matter of design choice to modify Minoru and Hochstein by having the reflector well having height no greater than twice a height of the chip, since such modification would have been involved a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Claims 10-11 and 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein in view of Waitl et al. (US 6,624,491).

Regarding claims 10, Minoru and Hochstein disclose substantially all the structure set forth in the claimed invention except the chip mounting area having a surface coating. However, Waitl et al. discloses on figure 1 the chip mounting area having a surface coating 18 (col. 4, line 61) for improving mounting of a chip 1. In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru and Hochstein by having the chip mounting area having a surface

coating to increase radiation input/output efficiency with the semiconductor chip (col. 3, lines 18-19).

Regarding claim 11, Waitl et al. discloses the surface coating is a silver coating (col. 5, lines 1-4).

Regarding claim 19, Minoru discloses in figure 1 substantially all the structure set forth in the claimed invention except the base body having a radiation outlet window, and said thermal connecting part embedded in the base body to dispose the chip mounting area in the radiation outlet window. However, Waitl et al. discloses on figure 2 the base body 10 having a radiation outlet window (col. 5, lines 17-19); and said thermal connecting part 3 (portion 3 of lead frame made of metal and can function as a thermal connecting part) embedded in the base body to dispose the chip mounting area in the radiation outlet window. In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru by having the base body having a radiation outlet window, and said thermal connecting part embedded in the base body to dispose the chip mounting area in the radiation outlet window to increase radiation input/output efficiency with the semiconductor chip (col. 3, lines 18-19).

Regarding claim 20, Waitl et al. discloses in figure 1 the radiation outlet window 10 has sidewalls in the form of reflector surfaces (col. 5, lines 17-19).

Regarding claim 21, Waitl et al. the radiation outlet window has reflective side walls 12 (col. 5, lines 19-20).

Regarding claim 22, the combination of Minoru and Waitl et al. discloses said thermal connecting part 20 has a reflector well 30 forming a first part of a reflector

(figure 1 of Minoru); said sidewalls of the radiation outlet window 10 form a second part of the reflector (figure 1 of Waitl et al.); and said well 30 merges to the second part 12.

Regarding claim 23, Minoru and Waitl et al. disclose substantially all the structure set forth in the claimed invention except an overall height of the reflector being no greater than four times a height of the chip. However, it would have been an obvious matter of design choice to modify Minoru and Waitl et al. by having an overall height of the reflector being no greater than four times a height of the chip, since such modification would have been involved a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding claim 24, the combination of Minoru and Waitl et al. discloses the chip 40 has a main emission direction; said reflector well 30 has reflector walls (figure 1 of Minoru); said radiation outlet window 10 has reflector surfaces 12 (figure 1 of Waitl et al.); and said reflector walls and the reflector surfaces are at different angles with respect to the main emission direction.

Regarding claim 25, the combination of Minoru and Waitl et al. discloses an angle between the reflector walls 12 (figure 1 of Waitl et al.) and the main emission direction being greater than an angle between said reflector surfaces 30 (figure 1 of Minoru) and the main emission direction.

Claims 13-14 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein in view of Han et al. (US 2001/0054761 A1).

Regarding claim 13, Minoru and Hochstein disclose substantially all the structure set forth in the claimed invention except at least one external electrical connecting strip having a surface coating. However, Han discloses in figure 3 one external electrical connecting strip 40 having a surface coating (para [0022], lines 4-5). In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru and Hochstein by having one external electrical connecting strip having a surface coating to provide an effective electrical connection of the semiconductor chip.

Regarding claim 14, Han discloses the surface coating is a gold coating (para [0022], lines 4-5).

Regarding claim 59, Minoru discloses in figure 1 the leadframe 50 is a surface mountable component.

Claims 41-42 and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein in view of Matsumoto et al. (JP402187058).

Regarding claim 41, Hochstein discloses in figure 2 substantially all the structure set forth in the claimed invention except the chip being mounted on the chip mounting area by a silver solder. However, Matsumoto et al. discloses in figure 4 the chip 5 being mounted on the chip mounting area by a silver solder 6 (see Abstract). In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru and Hochstein by having the chip being mounted on the chip mounting area by a silver solder to improve heat radiation (Abstract of Matsumoto).

Regarding claim 42, it is inherent the silver solder has a melting temperature greater than 260 C.

Regarding claims 47-48, similar to rejection of claims 41-42 above, the combination of Hochstein and Matsumoto discloses all steps of the method set forth in claims 47-48.

Claims 17-18, 54-57 and 62-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minoru and Hochstein in view of Huang (US 6664649).

Regarding claims 17, 54 and 62, similar to claim 1 above, Minoru and Hochstein disclose substantially all the structure set forth in claim 17 except an exterior surface to which the bearing surface mounting the housing. However, Huang discloses in figure 5 an exterior surface (printed circuit board) 560 to which the bearing surface (heat sink) 530 mounting the housing to further increase the heat dissipation efficiency (col. 5, lines 15-19). In view of such teaching, it would have been obvious at the time of the present invention to modify Minoru and Hochstein by including an exterior surface to which the bearing surface mounting the housing to further increase the heat dissipation efficiency.

Regarding claims 18 and 63, Hochstein discloses in figure 2 the chip mounting area (area on which chip 12 is mounted) and the thermal connecting surface (surface of element 18 where chip 12 is not mounted) are on opposite sides of the thermal connecting part 30.

Regarding claim 55, Minoru discloses in figure 1 a light emitting diode 40 mounted in the chip mounting area.

Regarding claim 56, Minoru discloses in figure 1 the housing base body 10 comprises the bearing surface.

Regarding claim 57, Minoru discloses in figure 1 the thermal connecting surface and the bearing surface are substantially planar.

Response to Arguments

Applicant's arguments filed on 06/16/2006 have been fully considered but they are not persuasive.

With respect to claims 1, 13, 17 and 52, applicant argues it would not have been reasonable to modify Minoru by including Hochstein's heat dissipater 30, which would increase the thickness of Minoru's device, contrary to Minoru's stated objective of providing a device with reduced thickness. However, as explained in the rejection of claim 1 above, in figure 2 of Hochstein, element 18 is the mount part where there is an opening extending completely through this mount part, and element 30 is the thermal connecting part which extends through the opening in the mount part and connects to the mount part at the opening to transfer heat away from the mount part (col. 3, lines 29-35). As such, modifying Minoru's device in view of Hochstein's teaching would result in a device that efficiently dissipates heat away from the light-emitting device and does not necessarily increase the thickness of the device. Therefore, it would have been reasonably obvious to one skilled in the art to combine Minoru and Hochstein herein.

Applicant's arguments with respect to claims 1-4, 6-15, 17-25, 27-28, 30-31, 33-49, 52 and 54-63 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
August 16, 2006



**JEROME JACKSON
PRIMARY EXAMINER**